

Amendments to the Specification

Please replace the paragraph beginning on page 4, line 27, with the following rewritten paragraph:

-- Figure 1A shows a diagram of a system for operating a variable compression ratio internal combustion engine in accordance with an example embodiment of the present invention. The engine 110 shown in Figure 1A, by way of example and not limitation, is a gasoline four-stroke direct fuel injection (DFI) internal combustion engine having a plurality of cylinders (only one shown), each of the cylinders having a combustion chamber 111 and corresponding fuel injector 113, spark plug 115, intake manifold 124, exhaust manifold 104, and reciprocating piston 112. The engine 110, however, can be any internal combustion engine, such as a port fuel injection (PFI) or diesel engine, having one or more reciprocating pistons as shown in Figure 1A. Each piston of the internal combustion engine is coupled to a fixed-length connecting rod 114 on one end, and to a crankpin 117 of a crankshaft 116. Also, position sensor ~~161~~ 160 is coupled to compression ratio mechanism 170 for measuring compression ratio position. --

Please replace the paragraph beginning on page 7, line 21, with the following rewritten paragraph:

-- Figure 1B shows engine 110 having a variable cam timing actuator. In this example, engine 110 is shown to be a direct injection spark ignited internal combustion engine, rather than the port fuel injection system illustrated in Figure 1A, since either type of fuel injection can be used. Here, combustion chamber 111 of engine 110 is shown in Figure 1B including combustion chamber walls 32 with piston 112 positioned therein. In this particular example piston 112 includes a recess or bowl (not shown) to help in forming stratified charges of air and fuel. Combustion chamber, or cylinder, 111 is shown communicating with intake manifold 124 and exhaust manifold 104 via respective intake valves 52a and 52b (not shown), and exhaust valves 54a and 54b (not shown). Fuel injector 66 is shown directly coupled to combustion chamber 111

for delivering liquid fuel directly therein in proportion to the pulse width of signal fpw received from controller ~~12~~ 160 via conventional electronic driver 68. Fuel is delivered to fuel injector 66 by a high pressure fuel system (not shown) including a fuel tank, fuel pumps, and a fuel rail.

Note that the variable compression ratio system can also be included, but is not shown. --

Please replace the paragraph that begins on page 9, line 13, with the following rewritten paragraph:

-- As indicated in Figure 1A, controller 160 is a microcomputer including: microprocessor unit 162, input/output ports 169, an electronic storage medium for executable programs and calibration values shown as read only memory chip 165 in this particular example, random access memory 166, and a data bus 168. Note that keep alive memory (KAM) can also be added if desired. Controller 160 is shown receiving various signals from sensors coupled to engine 110, in addition to those signals previously discussed, including: measurement of inducted mass air flow (MAF) from mass air flow sensor 102 coupled to throttle body 58; engine coolant temperature (ECT) from temperature sensor 106 coupled to cooling sleeve 108; throttle position TP from throttle position sensor 70; and absolute Manifold Pressure Signal MAP from sensor 164. Engine speed signal RPM is generated by controller ~~12~~ 160 from a profile ignition pick-up (PIP) signal coupled to the crankshaft in a conventional manner and manifold pressure signal MAP provides an indication of engine load. In a preferred aspect of the present invention, the PIP sensor, which is also used as an engine speed sensor, produces a predetermined number of equally spaced pulses every revolution of the crankshaft.--

Please replace the paragraph beginning on page 10, line 26, with the following rewritten paragraph:

-- Teeth 138, being coupled to housing 136 and camshaft 130, allow for measurement of relative cam position via cam timing sensor 150 providing signal VCT to controller ~~12~~ 160. Teeth 1, 2, 3, and 4 are preferably used for measurement of cam timing and are equally spaced (for example, in a V-8 dual bank engine, spaced 90 degrees apart from one another), while tooth 5 is preferably used for cylinder identification, as described later herein. In addition, controller ~~12~~ 160 sends control signals (LACT, RACT) to conventional solenoid valves (not shown) to control the flow of hydraulic fluid either into advance chamber 142, retard chamber 144, or neither.--